

REMARKS

Claims 1 - 17 are presently pending. In the above-identified Office Action, the Examiner rejected Claims 1 - 6 and 17 under 35 U.S.C. § 103(a) as being unpatentable over Kitahara *et al.* (U.S. Patent No. 5,634,850) in view of Adelson (U.S. Patent No. 5,706,417). Claims 7 - 16 were allowed.

The allowance of Claims 7 - 16 is gratefully acknowledged. By this Amendment, Applicant has changed the Title and the preambles of the independent Claims to conform with the limitations of the Claims as filed. As only the preambles of the Claims have been changed and none of the limitations in the bodies thereof, the amendments made in this paper should not necessitate a new ground of rejection.

For the reasons set forth more fully below, Applicant respectfully submits that the subject application properly presents Claims patentable over the prior art. Accordingly, reconsideration, allowance and passage to issue are respectfully requested.

The present invention addresses the need in the art for an image processing system or technique for extracting a desired image from a scene regardless of the background in the scene. Generally, the inventive system includes an arrangement for providing image data. A memory is provided for storing a first frame of image data consisting of a heterogeneous background scene. Next, the user provides an object as a foreground image into the scene, with the same background. This image is treated as a second frame of image data. In accordance with the invention, the second frame is processed to extract the foreground imagery therefrom. That is, the inventive system strips the background imagery from the second frame without using monochromatic screens or filters.

The invention is set forth in claims of varying scope of which Claim 1 is illustrative. Claim 1 reads as follows:

1. A system for extracting an image comprising:
first means for providing image data;
second means responsive to said first means for storing a first frame of image data consisting of a heterogeneous background scene;
third means responsive to said first means for providing a second frame of image data consisting of a second scene having said background scene at least partially obscured by a foreground object;
and
fourth means responsive to said second and third means for processing said second frame to extract an image of said object independent of said background scene. (Emphasis added.)

None of the references, including those cited but not applied, taken alone or in combination teaches, discloses or suggests the invention as presently claimed. That is, none of the references teaches a system for extracting an image of an object from a heterogeneous background scene.

In support of the rejection of Claims 1 - 6 and 17 under 35 U.S.C. § 103(a), the Examiner relied heavily on a combination of the teachings of Kitahara *et al.* and Adelson. Kitahara *et al.* purport to teach an image processing device and method by which a foreground to be combined with a background can be displayed with natural motion and a realistic superimposed image can be displayed.

The Examiner suggests that Kitahara teaches the invention as claimed with the following exceptions: 1) that Kitahara does not address processing with respect to a heterogeneous background scene and 2) Kitahara does not disclose the claimed fourth means for processing the second frame to extract an image of an object independent of the background scene.

However, Applicant respectfully submits that although the Examiner's assessment of the shortcomings of Kitahara is on point, the Examiner's list of shortcomings of Kitahara is incomplete. That is, Kitahara is clearly a system for **synthesizing** a composite image, not **analyzing** an image to separate foreground from background as presently claimed. (The relevance of this point will be made more clear with respect to the discussion below on the issue of whether or not it is proper to combine the teachings of Kitahara *et al.* with those of Adelson.) In short, in addition to the fact that Kitahara does not address processing with respect to a heterogeneous background scene (no second

means as recited in Claim 1) and does not disclose the claimed fourth means, Kitahara also fails to show the claimed second means of Claim 1.

In the Office Action, the Examiner does not further address or discuss the first admitted shortcoming of Kitahara, i.e., that Kitahara does not teach, disclose or suggest how to process a **heterogeneous** background scene to extract a foreground object. This is a significant shortcoming of the reference inasmuch as a key feature of the invention is that it enables foreground object extraction or identification in the context of a heterogeneous background scene. This eliminates the need for a monochromatic background (blue screen, green screen, black screen, etc.) as typified by the prior art.

With respect to the second admitted shortcoming of Kitahara having to do with processing a current frame to an image of an object independent of the background, the Examiner suggests that this shortcoming is addressed by a combination of the teachings of Kitahara with the teachings of Adelson. However, as discussed more fully below, this position is untenable as well, *ab initio* because Kitahara deals with the synthesis of a composite image, not the analysis of an image to extract an object.

Further, Adelson purports to disclose a moving image representation format encoding and decoding scheme. Adelson appears to teach a technique for image compression and decompression by which layers are separated and encoded and then decoded and recombined. However, Adelson clearly does not teach the claimed fourth means for processing a second frame of image data to extract an image of an object independent of a heterogeneous background scene as presently claimed.

In support of the rejection, the Examiner suggests that Adelson teaches that the step of image extraction is widely known in the art. However, this position begs the question: if foreground image extraction from heterogeneous backgrounds is so widely known, why are there are no references that may be cited in support of this assertion?

Indeed, where is this teaching to be found in Adelson? In support of the rejection, the Examiner suggests that Adelson provides this teaching at column 16, lines and 34 - 39. However, the passage referred to by the Examiner is a section of Claim 1 and reads as follows:

“ * * *
means for separating said image sequence into a plurality of **layers**,
wherein each layer corresponds to at least a portion of at least one
object in an image in sequence, **and if said at least one object**
includes an occulted portion, said layer also includes at least part
of said occulted portion,
* * *” (Emphasis added.)

A careful reading of this so-called teaching reveals:

- 1) nothing to suggest that foreground image extraction from a heterogeneous background scene is widely known, contrary to the assertion of the Examiner;
- 2) that Adelson seems to require a separation of an image into a plurality of **layers**; and
- 3) that Adelson provides no teaching as to how these **layers** are to be separated. It is presumed that these layers are to be separated using relative motion (see the Abstract, column 4, lines 16 - 20 and lines 41 - 43, and column 5, lines 26 - 44 for example). However it is still unclear as to how the layers are to be separated using relative motion.

Further, a separation of ‘layers’ is not equivalent to a separation of a foreground object from heterogeneous background. And the Examiner’s position to the contrary is undermined by the highlighted portion of the passage that reads: **“and if said at least one object includes an occulted portion, said layer also includes at least part of said occulted portion”**. This clearly indicates that in accordance with the teachings of Adelson, there is no separation of a foreground object from a heterogeneous background scene even when a tenuous interpretation of the teachings of Adelson is employed by which a separation of layers is equated with a separation of a foreground object from a heterogeneous background.

Hence, the Examiner’s statement: “. . . thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made that the extracting technique can be used to take out a desired part of image frame can be used in order to efficiently

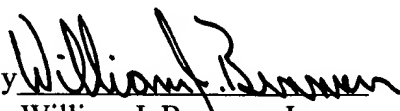
deliver the foreground and background so that one of the other could be easily separated and changed . . ." is a *non sequitor*.

Finally, as mentioned above, there is no basis for combining the teachings of Kitahara *et al.* with those of Adelson. That is, Kitahara is a system for synthesizing a composite image while Adelson appears to disclose a system and method for effecting image compression and decompression. It is well established that, in accordance with the holding of Graham vs. Deere, 381 US 1; 148 USPQ 459 (1966) there must be something in either reference that would suggest a combination with the other. An attempt to combine the teachings of these references without such a showing is improper under the holding of Graham vs. Deere.

In any event, for the reasons set forth above, the combination of the teachings of Kitahara *et al.* with those of Adelson still falls far short of teaching the invention set forth in Claim 1. At best, the combination might teach how to synthesize a compressed image or how to encode and decode a composite or synthesized image. It certainly would not teach how to analyze an image to extract an image of an object in the presence of background clutter.

Accordingly, Applicant respectfully requests that the rejection of Claim 1, and the Claims that dependent thereon, be withdrawn. In addition, inasmuch as Claim 17 is a method claim drawn along the lines of Claim 1, Claim 17 should be allowable as well. Reconsideration, allowance and passage to issue are therefore respectfully requested.

Respectfully submitted,

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